DOCUMENT RESUME

ED 253 262 JC 840 366

AUTHOR Thompson, Dennis
TITLE Peru, People and Plants.
INSTITUTION Edmonds Community Coll., Lynwood, Wash.
PUB DATE [84]
NOTE 41p.
PUB TYPE Guides - Classroom Use - Materials (For Learner) (051)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Course Content; *Cultural Influences; Field Crops; *Foreign Countries; *Horticulture; Interdisciplinary Approach; *Latin American History; Two Year Colleges
IDENTIFIERS *Peru

ABSTRACT

Designed for horticulture, horticulture therapy, and botany students at Edmonds Community College (Washington), this 6-hour module explores the pre-Columbian use of plant materials in Peru and its relationships to cultural practices in modern Peru. The first sections provide basic information about the module, such as its objectives, the concepts to be presented, required readings, purpose and instructional format, and out-of-class projects. Next, informational materials are presented for the six course units: (1) Historical Overview, which includes information on Peru's cultural groups, history. and the role of agriculture and horticulture in the society's development; (2) Gathering Horticultural Information, which discusses the difficulties of obtaining information on the lifestyles of societies that had no written language and cites methods of overcoming these difficulties; (3) Domesticated Plants and Their Uses, which looks at the variety of plants that are either known to have been cultivated or were possibly cultivated, and were collected at various periods in the history of Peru; (4) Plants in Mysticism and Medicine, which discusses the cultural significance of particular plants; (5) Ancient Traditions in Modern Life, which examines the operation of social customs and patterns in modern Peru; and (6) The Effect of Peru's Horticulture on the World, which reviews the influences of the exportation of certain Peruvian plants into Europe. (HB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED253262

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

D. Thompson

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☒ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

PROGRAM: International Studies

DIVISION: Humanities

NAME OF MODULE: Peru, People and Plants

WORLD AREA: South America - Peru

INSTRUCTOR: Dennis Thompson
Edmonds Community College
20000 68th Avenue West
Lynnwood, WA 98036

JC 840 366

DESCRIPTION OF MODULE:

This is a six hour module designed for horticulture, horticulture therapy and botany students to explore the pre-Columbian use of plant materials in Peru and its relationships to cultural practices in modern Peru.

The unit will focus on cultivated plants and their cultural significance in:

1. Pre-Columbian Peru (Chimu and Inca civilizations).
2. Extension of pre-Columbian community agricultural practices in modern Peru.
3. Significance and uses of pre-Columbian plants today.

OBJECTIVES:

After completion of this module students should be able:

1. To describe the pre-Columbian social structure of the Chimu and Inca, particularly as it relates to horticulture.
2. To describe the three methods of obtaining information about plant products of a society which had no written records.
3. To identify from a prepared list plants for food and industrial purposes.
4. To discuss plants and practices in medicine and mysticism under modern

examples and to trace modern practices from their ancient beginnings explaining the assimilation of ethnic influences.

5. To explain the correlation between the ancient agricultural tradition and cooperative colonization efforts of the residents of Pueblos Jovanes today.
6. To discuss the economic impact of the wide variety of plant foods historically produced in Peru.
7. To understand the influence of endemic Peruvian plants on other countries.

CONCEPTS TO BE PRESENTED:

1. One aspect of Peruvian culture is a distinctive agricultural method characterized by cooperative community efforts.
2. The contemporary uses of plants tend to be consistent with the traditional uses after the failure period of modern innovation.
3. Plants and plant products play a significant role in the health and religious lives of the community.
4. Plants and horticultural activity influenced social, political and economic structures.

REQUIRED READINGS:

References on reserve in the library.

Films: "The Incas, Vilcabamba: Valley of the Old Ones"
"The Inca Trail" (optional)
"The Spirit Possession of Alejandro Mamani"
"Edwardo, the Healer"

PURPOSE AND FORMAT:

The purpose of this module is to understand how beliefs and customs shape a culture's contemporary activity (i.e. the plant/people relationship); to explore

the role of plants in shaping history and society.

The format will be about seventy-five percent lecture/demonstration primarily concerning traditional practices, beliefs and plants, supplemented by transparencies, films and other audio visual materials. The remaining twenty-five percent will be class discussion, examination of live plant materials and a research assignment.

OUT OF CLASS PROJECTS:

1. Reading of required handouts.
2. Preparation of a dish containing at least one traditional food.
   OR
   A research paper on uses in modern American culture of Peruvian plants (i.e. houseplants or landscaping).

UNIT I: Historical Overview

Materials - Map of Peru, overhead charts, handouts, videotape "The Incas."
Chanchan, Ravines
Cusco: La Traza Urbana de la Ciudad Inca, Calvo
The Ethnobotany of Pre-Columbian Peru, Towle
La Agricultura Andina (II)

References- Peru Before Pizarro, George Bankes
Peru, Victor Alba
The Incas, Garcilaso de la Vega

It is impossible to observe functions within a civilization without at least a brief introduction to the culture itself. Peru's evolution integrated distinct cultural groups--the Chimu, the Aymara and the Quechua--into a totalitarian civilization with acute artistic, governmental, agricultural and mathematical skills. The empire reached from Equador and Columbia through Peru, Bolivia and Argentina to central Chile.

Cultures developing from a European background have always had a somewhat myopic view of the world. A history instructor once pointed out to me that right and God were always on the side of the winner whomever they might be and that the change they brought about was progress in their eyes even if it led to dark ages. Unfortunately that cynicism is most often true. The history of horticulture in the Americas is a prime example. Ask anyone about gardening in America and they will begin by citing the introduction of gardening in Jamestown or Williamsburg or with the Pilgrims at Plymouth. In a few cases, the story may be accompanied by the casual inclusion that the Indians provided the pioneers with corn and pumpkins. It is overlooked that fully a third of the commoner vegetables of modern gardens, many of our fruits and berries, and many of our ornamentals were in use--frequently under intensive cultivation--centuries before Columbus arrived in the western hemisphere. There were notable botanic gardens in Central and South America and a variety of foods was enjoyed by the native populations that was beyond the imagination of Europeans.

Mexico over the last few decades has begun to receive some recognition for its contributions. Early maps locate zoological parks and gardens and W. H. Prescott paints florid pictures of the scenery. Many codices include horticultural information collected by the early priests.

Peru has less recorded history. This is partially due to the illiteracy of the Conquistadors who were only after gold, partially to the destruction caused by the power struggle initiated by Atahualpa to depose his half-brother, and partially to the fact that the Incas had no written language. Atahualpa was attempting to move the Inca capital to Quito, Equador from the traditional capital of Cusco at the time of the arrival of the Spanish. In an attempt to force the shift, Atahualpa burned Cusco destroying the quipa libraries and much of the accumulated knowledge. It was the internal conflict, combined with a plague of European diseases that killed 90% of the native population before the Conquistadors arrived which made it possible for the ragged Spanish troops, with the help of dissident Chimus, to subdue the mighty Quechua empire. The booty, estimated to be as much as 7-10% of the gold in the world today, financed the industrial revolution and much of world expansion from the mid-1500's through the beginning of the last century. This is the end of the story; it is the setting and body of the tale that make up the lost chapters in American gardening history.

Peru of the early eras was made up of relatively small tribes who over several centuries established wide communication networks that eventually linked from Venezuela south to the Araucaria forest of Chile and east into the heart of Amazon country. The diversity of habitats within this area is phenomenal. Unlike the Great Plains and deserts of North America and Mexico, Peru within a few hundred miles east to west covers tropical rainforest through mild temperate jungles to cold altiplano grasslands (80^{o} most days and freezing most nights) upward to glacial permafrost then down the drier west, to stretches of coastal desert which receive no appreciable rain in decades but remain potential paradises of constant 70^{o} temperatures with vast water resources from rivers.

Peruvian agriculture developed with very specific methods of intensive plant culture within these microclimates. Selections of crops have developed that

perform best in specific sites. Besides the well-known irrigation systems of Peru, one of the most notable features in the country are the terraced fields on steep mountain slopes called andenes. The Andes mountains are actually named after this terracing which permitted the intensive horticulture which developed in this area. Instead of developing monoculture methods as we have attempted in the United States and Europe, Peruvian gardening developed a wide gene bank of food crops including integrated pest management and crop rotation. The diversity of crops and habitats reduced the potential of famine due to crop loss by guaranteeing more kinds of available crops. Many wealthier families (tribes and communities) owned land at a variety of elevations from the jungle through the altiplano to the desert coast. Production from these areas exchanged year round, providing fresh and preserved fruit, vegetables, meat and fish in the markets in most areas. (Chart A)

It is likely that the methods of commerce were not much different in pre-Columbian Peru than they are today. Major centers of commerce--Quito, Cajamarca, Chancay (Trujillo), Cusco and La Paz--are many in the same area. The roads built before the arrival of the Spanish are still the major routes. Because of the severe climate, the farmer in the altiplano (puna) has a relatively limited number of crops that can be produced at the very high elevation (8000-16000 feet)--lupine, oca, potatoes (including the freeze-dried chuno)--along with alpaca wool and metals are transported to the lowlands of the east. These are traded for some jungle produce or more often coca leaves. The leaves served not only as relief against the severe environment and strenuous labor but also as the primary currency of the country. Chewing the leaves in combination with lime ashes while working, reduced fatigue and seems to work as a stimulant. Use of the narcotic seems limited to the work association and medicine in the high altitude areas. (Tourists arriving for the first time at high elevations today are given a few cups of maté and sent to bed for a few hours to help avoid the notorious sirrouche, altitude sickness.) The leaves were traded for maize and chicha as the farmer ascended to the altiplano again. Leaves and produce were then carried again to the lower elevations of the west and traded for dried fish, maize, peppers and peanuts.

With the ready availability of food, the indigenous cultures developed quickly

in the secondary arts--textiles, ceramics, sculpture, jewelry and architecture. Cotton was a major product of the lowlands and most of the cotton for the European textile industries is directly descended from the varieties cultivated by the American Indians. Pima cottons with their fine texture show in materials dating to about 2000 B.C. Unfortunately, lost to modern man in the attempt for standardization, or possibly waiting to be rediscovered, are cottons whose natural fiber colors were tans, browns, greys and even tawny gold. By the Nasca/Paracas periods, weaving had reached the state of a high art on the coast ranging from gauze-like patterned lace to tapestry blankets. The range of colors went from cochineal red through indigo blue and mulli yellow including a wide variety of more subtle hues. The weaving was frequently incorporated with embroidery (using cactus needles), applique of material and feathers. Besides the normal dyeing of fiber there was also a sophisticated method of tie dyeing. There are varying ideas on the amount of the dye plants which were cultivated and which were simply collected from the wild and traded. A number of these plants have been cited from very disjunct habitats being cultivated. (Towle) For more information see Paracas Textile Module by Martin Lim.

The Inca culture which we tend to credit with all civilized development in Peru before the Conquistadors was actually a relatively late development. The tribes traced their origins to the south of Lake Titacaca in the area that is now Bolivia. Only the leader was actually an Inca--child of the sun--the people were Quechua. The style of governance was totalitarian, but arranged in a unique system that promoted the rapid spread and eventual development of the empire.

Urban settlement in ancient Peru followed both environmental and human dictates. The centers of the Moche and Chicama valleys are linked by 50 miles of irrigation canals, producing a very productive horticultural area. Towns occupied hillsides above the canal systems or adjacent sites (not within irrigated land). The choice sites generally reduced potential problems from insects and seasonal flooding as well as preserving agricultural land. Population densities reached high levels due to the irrigation systems, fertilization programs and ocean fishing. Today the original systems are still in use in some of the coastal (Trujillo) and mountain (Pisac and Ollataytamba) areas. Unfortunately, these are

rarities. Most of the systems are in disrepair from lack of co-ordinated maintenance that was carried on during the pre-conquest periods. European approaches to land use and distribution have disrupted the old system without providing a workable alternative. This fact, as much as the recent droughts, accounts for the reduced food production in the altiplano and most of the country.

The Chimu people (Chancay) inherited a long tradition of coastal culture from the earlier Moche. Inheriting the extensive irrigation system and technical skills, the Chimu established a caste system headed by a God-King with elite classes of priests, nobility and military. (A distinctive subculture cohesion lasts even today.) The largest city of this empire was Chan Chan, covering about 7 square miles surrounded by walls 24 feet tall around nine compounds. Inner sections were surrounded by shorter labyrinthine walls decorated with intricate patterns. Each new king built a compound and filled it with the wealth of the land. When he died the wealth and a large retinue were buried with him and the compound cared for by his descendants. The major population of the city lived outside of these elaborate compounds. It is estimated that the population at the time of the Spanish conquest numbered over a million people making it the largest city in the world. The outskirts of the royal city were occupied by artisans, technicians and farmers who made the system functional through their loyalty and obedience. (Ravines)

The Chimor kingdom was contemporaneous with the Incas and occupied outposts in the mountains as well as the more notable coastal areas. It extended south to the valley of the Rimac where the Inca kingdom began. It occupied an area roughly six hundred miles long and from twenty to one hundred miles wide. Fearing the Incas, the Chimu erected great fortifications and united coastal tribes into a confederation. The inevitable war between the Chimus and the Incas occurred about 1460. The king of Cajamarca allied with the Chimu but fell to the Inca forces. The king of the Chimor empire after a long period of resistance fell to the Incas. The king was carried off as hostage and roads were built to the city.

The defeat of the Chimu kingdom supplied the capital Cusco with a large supply

of artisans and treasure and the Quechuas with their finest crafts. The Incas had not completely incorporated the Chimor empire into their structure when the Spanish arrived making a powerful ally against the mountain empire.

The culture-building processes of the ancient Peruvians produced totalitarian civilizations. The Incas established their extensive empire by consolidating the peoples into their domain rather than trying to annihilate or incarcerate them. The empire stemmed in concept and development from the ninth Inca, Pachacuti Inca Yupanqui. Pachacuti seized power in a coup d'etat and defeated the Chancas acquiring not only their extensive southern montane lands but also providing fierce reinforcements for an army that annexed territories to the north and east.

The sudden death of Topa Inca and his heir apparent in 1524 left two half brothers Huascar and Atahualpa to struggle. Atahualpa wished to move the capital of the empire from Cusco to Quito. In the course of the eight year war, he burned Cusco before the Spanish arrived. The civil division led to confusion among the loyal working class and reminded a number of their recently lost independence.

The Inca technique of conquest was primarily based on the concept of relocated groups, mitm'q or mitimaes. This sort of community action binds together to produce the needed crops in areas other than their homes or to do work such as road building or even military service. Villages of people were relocated into new environment to supply jungle or seaside produce for the montane society. The transfer might be for a short period, though it often was permanent. Soldiers were never sent to war against their neighbors, but against distant tribes where there was no personal conflict. Occupation troops were left to intermarry with the subjected tribe, teaching them Quechua and providing stabilizing examples. The culture of the conquered tribe was not removed but supplemented with additional deities and rules. The distinctness of ethnic states was preserved under the Inca rule and the residents of provinces and local towns wore special dress--ponchos, blankets, hats, etc.--as a badge of their citizenship.

The modern Pueblos Jovanes, young cities, are outgrowths or more accurately,

modern examples of pre-conquest social organization. These are discussed in a later unit in detail.

The provincial towns as well as the capital was composed of allya. This unit included kinsmen or extended families which made up small communities. Mitm'q often corresponded to the allya in resettlements and the structure is still found today in the Pueblo Jovanes. The units are amazingly self-supportive and strong.

Inca nobility was formed by twelve allyas. These ruling families lived in Cusco and were supplemented in the provinces by native rulers, curacas. As the empire expanded new rulers from the conquered areas were added to the ranks of nobility. The positions were primarily hereditary and local, establishing an indirect system of control over all conquered areas. These provincial units supervised local units of 1,000 or more people. To insure the loyalty of the outlying groups, the Inca arranged for the intermarriage with the members of the existing nobility and provided court activities and schooling for the children of nobles in Cusco. These served as incentives for royal support as did the grants from various levels of the ruling class. The Inca selected members of the nobility for higher administrative offices. The population of the empire was divided into decimal units for taxes and other state purposes. A chief at each level supervised levels below him. Extensive record keeping (quipas and the use of decimals) helped maintain a functional administration. (Calvo)

The lower functional levels of the society paid taxes to the administration and performed tax labor in standard portions, exact time/labor relations. In years of natural famine, they were supplied from the royal stores in the area or from other sources. They were expected to replace the stores in years of plenty. Weaving, crafts, food preservation, and all tasks were taxed and the craftsmen with these special skills formed special classes, which they occupied for a lifetime, that were taxed in the same method as the agricultural workers. Roadbuilders, bridge builders and masons occupied similar classes as did the elevated priests, oracles, diviners and curers.

In return for these specialized taxes, the public received a full calendar of

festivals and public celebrations at which the Inca furnished food, liquor, music and gifts from the public (tax) larder. There was little problem from reduced food supplies due to the large fresh-dry stored supplies and the production from the wide variety of altitudes. Personal lands were tended after the royal lands and an allotted number of days each year were set aside for royal (public) projects including irrigation construction and repair, roadwork, building and community or provincial work. People were tied to the land and with the exception of these special projects rarely left their immediate homes and then only with the permission of the curaca.

At its largest, the Inca empire is believed to have occupied an area over twice the size of Spain and this does not include much of the unidentified jungle area. It stretched from the Ecuador-Columbia border to the Bio-Bio River in central Chili including all of the Bolivian highland and northwestern Argentina. One of the great problems within this area today is that over four centuries of maintenance on the Inca-controlled projects no longer exists. Irrigation systems which once produced abundant foods lie in disrepair. Gone are the storage facilities (which supplied the Conquistadors with foods for conquest for over twenty years), and organization of public work and communication. (Alba, Bankes)

UNIT II: Gathering Horticultural Information

Materials - "Vilcabamba: Valley of the Old Ones"

References - Units II and III
Flora of Peru, MacBride
The Ethnobotany of Pre-Columbian Peru, Towle
Historia de Nuevo Mundo, Cobo
The Incas, Garcilaso de la Vega
Letter to a King, Huaman Poma
Plant Hunting in the Andes, Goodspeed
Conquest of Peru, Prescott

Assembling information on lifestyles from societies that had no written language poses major barriers to researchers, particularly when the conquerors were after treasure and destroying artifacts without keeping records. Unfortunately this has most often been the case. Peru is an excellent example of the problem and attempted solutions.

The primary method of gathering information on a culture is from the writings of the people prior to contact with the outside world and the observations of the invaders. In Peru both are painfully lacking. The Quechua, without a written language and in the midst of a civil war, would have been a poor source of information even if the Conquistadors had been interested in information rather than treasure. The best records are in pottery which represent both plants and tools commonly in use in Peru today. The treasure which might have contained a valuable collection of information in its form and use was melted down in Peru for shipment to Spain. No information then is available from the most available and esteemed artifacts. Only a thin string of comtemporary or near contemporary information about the Incas at the time of conquest is available. With the exceptions of Pedro de Cieza de Leon, Bernabe Cobo and Felipe Huaman Poma de Ayala there are no reports of Inca life contemporary with early Spanish settlement. Huaman Poma was of Quechua nobility born in Peru a few years before the conquest, but his book Letter to a King: A Peruvian Chief's

Account of Life Under the Incas and Under Spanish Rule was completed eighty years after the Spanish invasion as reminiscences strongly colored by a Spanish upbringing. Bernabe Cobo's work was published in 1567, considerably earlier than the bulk of Poma's work, but it was strongly colored by his theological views as a priest. The earliest and most useful of the works was Cronicas (The Incas) by Garcilaso de la Vega which was first published in 1553 and written during his service in Peru beginning in 1535. During his service he saw much of the country including Cusco and the Lake Titacaca region as well as Quito, Cajamarca and the coast. Although there is limited knowledge of his educational background, it would appear to have been rather thorough for its day, being solidly founded in humanism. His views of the New World bear much less shading by social mores of the Catholic conquest than most of his contemporaries and successors.

> "I have brought together and compiled this history of what I saw and experienced and from reliable information I received from persons whose word could be relied on. For what I write here is the truth. . .and the difficulties of land, mountains, and rivers. . .intolerable hungers and trials have never stood in the way of my. . .callings. . . . And if this history is not written with the polish which learning gives to letters, nor with the necessary pomp, it is at least full of truth. . . and concluded in Lima, City of the Kings, in the Kingdom of Peru, on the eighteenth of September, when its author was thirty-two years old, having spent seventeen of them in these Indies."
>
> (Cieza)

The second method of exploring plants in the lives of pre-conquest America is in the field of the archeologist. Remains in funeral sites and living sites can be analyzed for their first appearance and frequency and for preserved usage. It is somewhat inexact science at best, depending on remains that are now always identifiable or more importantly may not present a view of typical life. Chemical analysis of materials may provide keys in identifying vegetable fibers

and dye pigments. Pottery and design motifs also illustrate plant materials common in Inca life but do not offer good documentation on many horticultural specifics.

The third method of studying uses of plants is contemporary study. There are actually two main branches related to plant usage: the ethnobotanist and the plant taxonomist. The ethnobotanist examines modern practices in isolated sites applying observations to what is known archeologically. The plant taxonomist identifies plants and their distribution. Frequently plants out of typical distribution indicate a spread by man. Amounts of variation of distribution within a small area is also due to the intervention of man. These two fields combined with a study of indigenous lore can result in expanded understanding of plant/people relationships.

UNIT III: Domesticated Plants and Their Uses

Materials - Foods available from list (variety of maize, potato, etc.)
Dried potatoes (commercial trail foods or other non-mashed, freeze-dried forms)
Cotton, tule, and industrial materials
Handouts

The most thorough of the modern archeological studies available on Peru is by Margaret Towle, The Ethnobotany of Pre-Columbian Peru. It is the basis of the following chronology:

The first tangible evidence of the growing of domesticated plants marks the beginning of the Epoch of Incipient Argiculture (about 2500 B.C.). Only a few sites have as yet been discovered that represent this early manifestation, which was to develop into the most highly organized agricultural system in the New World in prehistoric times. These sites are the remains of small villages of subterranean and semi-subterranean houses located on the coast, whose inhabitants depended upon an economy of fishing, gathering and horticulture. The remains of a number of species representing both cultivated and wild forms have been found, the latter group furnishing both food and industrial materials. In the pre-ceramic culture, the people were dependent upon baskets and gourd containers and mats. Twining and weaving were practiced, a native cotton and various other fibrous plants supplying the necessary materials. The cultivated species are limited, the absence of maize being the most notable feature.

The first site is Huaca Prieta in the Chicama Valley on the north coast. A large number of vegetal remains were recovered here. The remains created to this level include:

Cultivated

- Squash (Cucurbita moschata)
- Squash (C. ficifolia)
- Gourd (Lagenaria siceraria)

Possibly cultivated

- Chili pepper(Capsicum annuum)
- Cotton (Gossypium spp.)
- Achira (Canna indica, C. edulis, C. glauca, C. iridiflora?)
- Lucuma (Lucuma obovata)
- Ciruela del fraile (Bunchosia armeniaca)

Collected

- Cat-tail (Typha augustifolis)
- Sedges (Scirpus spp, and Cyperus spp.)
- Algarroba (Prosopis chilensis and P. limensis)

Evidence of the type of agriculture practiced and the tools that were used has not been found. It appears, however, that the cultivated plants were grown in

small garden plots on the marginal lands in the lower river valleys.

The Formative Epoch (750 B.C.--A.D.) followed the Epoch of Incipient Agriculture and was one of long duration and progressive cultural activity. There was an increase in the coastal population, although the communities remained small in size, with some larger centers being built about platformed temples in the valleys south of Viru.

The economy continued to be based upon fishing and agriculture, the latter reflecting advances in methods and number of cultivated species. In these levels in the Chicama Valley, maize, peanuts and the common bean are present. These additions are of particular interest, since they make their appearance with the elements of Chavin influence, a definite highland manifestation.

Peanuts and manioc, reported from contemporaneous Early Ancon levels on the central coast, constitute a cultivation complex that is associated with the warm temperate valleys of the Amazon drainage system. Their appearance on the coast brings to mind Tells' theory that cultigens characteristic of the inter-Andean valleys were possibly carried thence by traders or migrating groups down to the coastal valleys. Coca is also added to the list. With the increased production of manufactured objects, the utilization of industrial plants must also have increased proportionately.

Certain species of cultivated plants recovered from sites in coastal areas attributed to the early periods of the Formative have not been reported from some of the later ones. The plant species associated with the cultures are:

Cultivated

- Chili pepper
- Common beans (Phaseolus vulgaris)
- Cotton
- Gourd
- Jicama (Pachyrhizus tuberosus)
- Lima beans (Phaseolus lunatus)
- Maize (Zea mays)

Manioc (Manihot esculenta)
Peanuts (Arachis hypogea)
Pepino (Solanum muricatum)
Potato (Solanum tuberosum)
Quinoa (Chenopodium quinoa)
Squash
Sweet potato (Ipomoea batatas)

Possibly cultivated

Achira
Campomanesia (Campomanesia lineatifolia)
Coca (Erythroxylum coca)
Guava (Psidium guajava)
Pacae (Inga freuillei)
Palta (Persea americana)

The increasing occurence of stone hoes and digging sticks in Formative sites is further evidence of greater agricultural activity.

The subsequent Classic Epoch (1-1000 A.D.) on the north and south coast is characterized by the growth of regional cultures in which the technologies of the previous epoch reached the peak of their development. Settlements ranged from fair-sized villages to large population-centers situated in the major coastal valleys. Subsistence was almost completely dependent upon intensive agriculture; the population which was at this time over 1,000,000 demonstrates the interaction between food supply and population increase.

The number of domesticated species and wild food plants utilized during this epoch is impressive. It is noteworthy that no additional cultigens appear until the time of the Spanish conquest. The wild food plants that were first observed during this epoch probably had been part of the vegetable diet in previous periods but no remains of the plants or molded forms have been found. The species utilized are:

Cultivated

Chili pepper

Common beans
Coca
Cotton
Gourd
Jicama
Lima beans
Llacon
Maize
Manioc
Peanut
Pepino
Potato
Squash
Sweet potato

It will be noted that the squash, Curcurbita ficifolia, is not on this list. This species has not been reported later than the Cupisnique levels at Huaca Prieta. However, the Hubbard squash, C. maxima, is found for the first time.

Possibly cultivated

Achira
Algarroba
Campomanesia spp.
Canavalia
Cherimoya (Annona cherimolia)
Ciruela del fraile (Bunchosia armeniaca)
Guanabana
Granadilla (Passiflora spp.)
Guava
Lucuma (Lucuma bifera)
Pacae
Palta
Papaya (Carica papaya, C. posopora)
Pineapple (Annas comosus)
Tumbo (Passiflora quadrangularis)

Tuna (Opuntia sp.)

Cultigens associated with highland agriculture

Anu (Tropaeolum tuberosum)
Lupine (Lupinus mutabilis)
Oca (Oxalis tuberosus)
Potato
Quinoa
Ullucu (Ullucus tuberosus)

The high level of agricultural development in the coastal area is reflected in the intricate valley-wide irrigation systems. The canals and aqueducts are often of impressive size. Agricultural tools in the form of hoes and digging sticks are commonly found, and it has been suggested that guano fertilizer was utilized. It is indeed possible that nearly all agricultural techniques associated with the prehistoric cultures of the Central Andes had been developed and were in use by the end of the Classic Epoch.

The outstanding feature of the Epoch of Fusion (1000-1532 A.D.) is the binding of cultures of the coastal and highland regions into a common relationship. Remains of cultivated plants from the coast represent species already familiar from the previous epochs. A wider distribution of certain of the highland cultigens is apparent. In contrast to the firmly established food plants, plants of industrial and medicinal use increased perceptibly during this epoch. These species are largely identified from among the vegetable remains recovered at the site of Ancon. No new cultivated species appear to have been added until the arrival of the Spanish. The agricultural practices of subjugated areas on the coast continued to be used after the Spanish conquest. In the highlands, agricultural techniques reached their peak of development with the construction of the impressive terracing and irrigation systems, the remains of which are monuments to the imagination, skill, and enterprise of the Inca in the development of their agricultural economy. The ensuing Colonial Period saw the collapse of the most highly organized and complex agricultural system attained in the New World. (Towle)

There were well established trade routes between the jungles, mountains and

coast. Besides these well known trade routes there is relatively strong evidence that trade by sea may have also been common as far north as Central America or even Mexico.

Plant taxonomists during the last half century have also added a large amount of data to the understanding or pre-Columbia horticulture. Two major sets of information were presented by T. Harper Goodspeed's work for the University of California Botanical Garden in 1935-36 and 1938-39 and MacBride's work for the Chicago Field Museum of Natural History. MacBride's work was completed in Chicago from botanical specimens collected by Goodspeed and his colleagues and by Peruvian collectors. The work is particularly useful in that it lists native use of the plant materials as well as distribution.

Goodspeed's Plant Hunters in the Andes is a rambling journal of the two collecting trips that he headed to Peru and Chile. Much of MacBride's flora relied on collected specimens from Dr. Harvey Stork, Mrs. Inez Mexia, Prinz Egor von Ratibor (James West), Dr. John L. Morrison, Bob Horton, Dr. Cesar Vargas Calderon and Dr. Goodspeed. Of Machu Picchu, Goodspeed relates:

> Many collections were made in and about Machu Picchu. Some of the plants we found suggest that the Incas might have grown them as ornamentals. Certainly there appeared to be an unusually large number of showy species in, or close to, the ruins. For example, a splendid red orchid, a Maxillaria, was common in the terraces and on the bits of open ground between the buildings. Again, there were handsome species of Oxalis and a succulent that looked like Sedum growing in the crevices of the smooth and close-set walls. Finally, almost in the streets of the ruined city, the Prince found Calceolaria tomentosa, the giant slipperwort. We did not come across it elsewhere in the Andes, although it is known from other Andean areas. Probably the presence of so many plants of these and other fine ornamentals in and around the City of a Thousand Steps was only coincidence, but at the time it made a different impression.

(Option, slide series, "The Inca Trail" from Carolina Biological Supply Company.)

McBride's flora provides lists of some of the cultivated plants with specifics related to their uses in Peru.

Zea Mays L. Sp. Pl. 971. 1753. Maize, Indian corn, Maiz.

Cultivated generally in Peru, and the principal grain and food plant of the country, as it is in most other parts of America. Corn is believed to be a native of the highlands of Mexico or Central America, but it is not known in the wild state, nor is it able to maintain itself in competition with wild plants.

Regarding the varieties of maize cultivated in the Department of Cusco, Professor Fortunato L. Herrera has given a detailed account. His classification of them is reproduced here in part.

I. Flint corn

Uhina, Ubina, Ckello-sara. Common yellow maize. The variety most cultivated, and the one showing the greatest variation from one locality to another. It endures drought and yields well. The ears can remain a long time on the stalks after maturity without loss or deterioration. Used for food in the form of mote (boiled), and especially for making chicha, the maize of the Province of Paucartambo being particularly valued for the latter purpose.

Piricincu. An early-maturing variety, ripening in three months, so that it is possible to obtain four crops a year. The very small kernels are deep yellow. Employed in the form of lahua (meal), and for making chicha. Cultivated in the Province of Convención.

Uchucullo. Little cultivated. Kernels deep yellow. Like the preceding variety, it matures in three months.

Ckallhua. Kernels whitish, becomming slightly yellow with age, horny in appearance, lustrous, and transparent. Used for perparing locro, mazamorra, mote, and chochoca. Cultivated in the provinces of Paucartambo and Quispicanchi.

Chile-sara. Pearl maize. A form probably imported, perhaps from Argentina. Planted on a small scale. Kernels rather small, horny, somewhat lustrous, pearly, whitish.

Chaminco, Puca-sara. Common red maize. Like the yellow variety, this shows many variations in different localities. It is characterized by the brilliant orange-red color of the ears and kernels. The later are hard, horny, and transparent except for a spot over the embryo. It is valued for making chicha, mote, and other articles, and is cultivated in the provinces of Paucartambo and Quispicanchi.

Maiz de Nueva Granada. Purple maize, from its name probably imported from Columbia. The ears are large, cylindric-conic, and 20-22 cm. long. The kernels are compressed and irregularly rounded. Cultivated in Quispicanchi and Convención.

Culli. Dark purple maize. Cultivated upon a small scale. Preferred for making the sweet chica morada, a refreshing drink.

Chingo. A slow-growing maize, with wine-colored kernels; ears small; little planted. Province of Anto.

II. Soft or starchy maize

Paraccai-sara. A white maize of vigorous growth, whose ears show great variation in shape and size, and the kernels corresponding differences in shape, size, and color, but they always have certain common characteristics, such as their great development and their mealy consistency, which make them suitable for the preparation of tamales and humintas of superior flavor. Used also in the form of mote. The white meal is highly esteemed. Cultivated in the whole department, especially in the Quebrada de Urquillos, whose product has a high reputation.

Sacsa. Pink or yellowish maize. The kernels vary greatly in size and form, being sometimes compressed, again concave or swollen, and in color yellowish, pink, purple, bluish, etc. They are mealy in consistency, and white in section except for the epidermis in the colored varieti[illegible] This variety gives an abundant white meal. It is little c[illegible]ated. Eaten chiefly parched.

III. Dent maize

Laurel. Yellow dent corn. Ears small and thick with large kernels. Used for making humintas. Grown in the Province of Convención.

Ico-laurel. Differing from the preceding in its pointed kernels. Employed for the same purpose, also for mote. Cultivated on Convención.

Chchunchu-sara, Maiz chuncho. Ears very long and slender, the small kernels variously colored. Used as feed for poultry. Cultivated in Convención.

Huaira-sara, Maiz morado. Kernels coffee-colored or gray. Used for making wine-colored chicha; also eaten parched. Cultivated in the provinces of Paucartambo and Quispicanchi.

IV. Sweet Corn

Chchullpi. The common wrinkled yellow sweet corn, with many varieties. The preferred forms are those related to the white varieties of maize. Cultivated on a small scale. Common to Peru and Argentina, where probably it was introduced by the Incas. Sometimes eaten parched or as mazamorra. Cultivated in Urubamba and Quispicanchi.

Pesccoc-runtum, Chchuspi. Kernels gray, with whitish granulations. Eaten parched, and made into chicha. Cultivated in Urubamba, Quispicanchi, and Paucartambo.

Other varieties

The following forms it is difficult to classify definitely with those listed above.

Chihuanuai. Kernels pale red. Used for making chicha.

Capuli. Kernels bright red. Used for chicha. Grown in the Province of Urubamba.

Occe-sara. Kernels lead-colored or coffee-colored. Eaten parched. Grown in Urubamba, Quispicanchi, and Paucartambo. Sara is the Quechua name for maize.

Pata-pfahuaucue and Hualla. Cultivated in the valleys.

Oxalis tuberosa Molina, Sagg. Nat. Chile 3: 109. 1782

W. H. Hodge, Journ. N.Y. Bot. Gard. 47: 214-224. 1946, has given a good account with excellent photographs of this species (and Añu, Tropaeolum tuberosum) commonly cultivated (to at most 3,800-4,000 meters, five Weberbauer) for its starchy tubers, which, rich in crystals of calcium oxalate, must be cured several days by leaving in sunlight when they may be eaten. They are usually boiled as potatoes. When they are to be stored a chuno, called cjaya, is prepared in the manner used for that of Solanum tuberosum, described by Herrera, Sinop, Fl. Cusco 1: 284. 1941; also by Hodge, l. c. 218. The former listed "Lluchcho-occa" as well as "Sapullu," "Chacha-pea," "Pauccar" and"Mestiza" as native names for tubers colored red, yellow, gray, red, and black. Hill, Bull. Misc. Inf. Kew 169-173. 1939, found the color differences of tubers in Bolivia associated with long-styled flowers (yellow), medium (white), short (red).

Bolivia to Columbia. "Occa-occa," "bueno grillo."

Ullucus Lozano

An herb with potato-like tubers, at first erect but soon sprawling and somewhat twining, succulent. Perianth parts spreading, narrowed abruptly from an oval base to an elongate, nearly linear, appendage-like tip. Anthers dihiscent apically.--Important as a food plant. In the cultivated form almost bush in habit. The tubers attain the size of small potatoes, but are usually more elongate, and generally pale yellow with violet "eyes." When cooked they are rather sweet and palatable but "wet." The Peruvian peasants freeze them after soaking them in water, then they are sun-dried or pressed and dried, for preservation for an indefinite period, in the same manner in which they treat potatoes. After this treatment they resemble "chuño" and like it emit an odor in cooking that is very disagreeable to one not accustomed to it, but after some experience, as in the

case of the "chuño" or potato so preserved, they may be eaten with some relish, at least upon necessity. Herrera records the name "lingli" for the dried product; Pflanz, "tunta." Ruiz and Pavón found them a common food but eaten also as an aid in child-birth.

Ullucus tuberosus Lozano in Caldas, Semanario de Nueva Granada 184. 1809.

The species is variable, and Herrera, Contr. Fl. Cusco ed. 2. 70-72. 1921, has recorded the native names of cultivated and wild races as they occur in that department as follows:

Tubers white: Mestiza chchuccha, yurac-lisas, or yurac-ckolla, the last with tubers produced in abundance but very small.

Tubers yellow: Ckello-chuccha, ckello-lisas, or ckello-ckolla.

Tubers yellowish red: Bela-api-chchuccha.

Tubers rose-colored: Muru-chchuccha, muru-lisas, or muru-ckolla, the last large.

Tubers reddish: Puca-lisas.

Herrera notes further, without indication of color: Chucchan-lisas, long and of superior quality: Ckolla-lisas, considered inferior; Kitalisas (wild "papas lisas"), extremely bitter, not edible; and Atoc-lisas or kpia ullucu (wild smooth potatoes), esteemed fresh. The former has been found in the provinces of Paucartambo, Urubamba, and Huaipo. the latter in Anat, Quispi-canchi, and Urubamba. The species is said to ascend to over 3,800 meters in a wild state in Bolivia, and in Peru it is found in the central sierra and interandean regions (Weberbauer), where especially frequent in cultivation.

Columbia; Bolivia. "Papa lisa," lisas," "ullucu," "ul juku."

Theobroma L.

by Jose Cuatrecasas

A neotropical genus with 18-20 species distributed in the rain forests of South and Central America, many of them localized endemisms, others very much spread, mostly through cultivation. The

seeds of Theobroma are appreciated as food and a stimulating beverage (cacoa, cocoa, chocolate), and one of its species (T. cacoa and varieties) constitutes one of the most important economical tropical crops. See C.J.J. Van Hall, Cacao (Macmillan & Co., Ltd., London, 1932). The name Theobroma, given by Linnaeus, is derived from the Greek, meaning "food of the Gods" (Theos=God, broma=food).

Malpighia punicifolia L. Sp. Pl. ed. 2. 609. 1762; 622.

Cultivated or at least protected and the edible fruit harvested as "cereza" or"Barbados cherry"; it is pleasantly aromatic but acid and improved by cooking with sugar (Dahlgren). Illustrated, Dahlgren, Trop. & Subtrop. Fruits, Chicago Nat. Hist. Mas. Pop. Ser., Bot. 26: 46. 1947.

UNIT IV: Plants in Mysticism and Medicine

Materials - house plants Scindapsus aureaus
Philodendron domesticum
Adiantum veneris-capillaris
Codiaeum sp.
Diffenbachia sp.
Caladium sp.
Euphorbia pulcherrima

handouts
"The Spirit Possession of Alejandro Mamani" - film
"Eduardo: The Healer" - film

References - Eduardo: The Healer, Sharon
Spirits of the Four Winds
Donde Hay No Doctor

The ancient religions of Peru recognized three planes of existence: the sky, the earth and the underworld. All of these planes had both positive and negative aspects and were irreversibly linked. It is thought that the upper and lower levels of Inca society may have been related to the opposing halves. Most natural materials were personified and associated with its powers of good and evil. Most spirits were to be respected and appeased if disturbed. In their attempt to mold an empire, the Quechua created a pantheon of deities headed by Virachocha and Mamacuna adding the deities of each conquered group. (The pantheon practice has continued adding Christian figures to the traditional.)

Curers were a portion of the class structure since pre-conquest times. The curer was actually a combination of diviner, doctor, spell caster and spell breaker. Those dealing with black magic are often referred to as brujos. Curenderos (healers) are contacted to counter the evil hexes, for medical help, and related help. As one curendero explained, there are four groups of curenderos: the black curendero who castes hexes and spells, the red curendero who deals in love potions and spells, the green curendero who identifies evil spells and redirects or alters them, and, the white curendero who works with healing

and health. The categories are not totally distinct and there is frequently overlapping.

The mesa of the modern incorporates the pre-conquest ideas of the world while incorporating many Iberian (Christian and Moorish) concepts while never losing the Quechua base. Commonly, today's mesas retain the concept of three levels of existence, staffs reaching from the underworld to the sky, the surface of the mesa being the earth itself. The mesa is divided into a left and right portion bringing the two sides of existence into play--these sides are divided by a cross with appropriate talismans to the left and dark. Depending on the curendero, emphasis may be placed on either side. Divination, hexes and psychotherapy are all fields of the curendero. In a country of limited funds and medical services, curenderos fulfill a need filled by paramedics, counselors and therapists in the United States. Curenderos are often the first and the last individuals contacted by patient/clients of all income levels. Over the past twenty years there have been studies conducted on the operation and effects of the system. Studies of Douglas Sharon with Eduardo Calderon have supplied background on the Peruvian curendero. "Eduardo the Healer" serves as an introduction to the healers.

Mulli (Schinus molle) is a plant that has developed in Peruvian culture as one of the companions of the mystics. A bright willow-like tree, this desert dweller has a faithful following in Peru. It is one of the most common trees in the arid coastal and low montane region, where it is large and picturesque, with a short, fat trunk widely over-topped by the spreading round crown. In many Spanish-speaking lands it is called "Peru" or "pimento del Peru," since when it is rubbed between the fingers the fruits suggest plack pepper because of their volatile oils. In the United States this tree is frequently called pepper tree or California pepper tree.

The Incas referred to Shinus as the tree-of-life; it is probably the tree used by the oracles of Pacucamac for divinations. (The trunk of this tree of the oracles was housed in one of the temples and dressed as an old woman.) It prefers stream-side habitats. The leaves are used for an "abono catalitico" called R'ockescca in which seeds of maize are placed. Medicinal uses include

plasters for fractures and ulcers from the fragrant resin and the chicha flavored with the fruits is said to be "sweet and agreeable to them and excellent against dropsy." Young roots are used to treat rheumatism and a tea of the leaves is good for diabetes. The natives say that the seeds cannot be used like pepper, however, without causing great damage to the health. (In France where the tree is commonly cultivated, the seeds are considered highly poisonous.)

The wood is of good quality and is favored in this land where timber is scarce. Houses with mulli in the construction are considered favored. The ashes are used in the purification of sugar and the fixing of dyes. It is suggested that mulli is one of the ashes chewed with coca leaves.

In the south, around Arequipa, the plant is called salsi. It is common in and around the city and is used by the natives in intensive copesing programs. One artist from the city claimed that no landscape scene is done by an Arequipanean without a salsi for luck.

Because of its pre-conquest favor, it is uncertain what the original distribution of the plant may have been. It is now cultivated through much of the lowland and moderate elevation areas from Equador to Chile.

Other herbs, particularly hallucinogenic ceremonial materials such as San Pedro cactus, Datura, tobacco and lesser members of the nightshade family are among the arsenal of the curenderos and brujos, as are the tropical poisons (such as ciari) and tropical medicines (such as quinine). Plants most often have the two sides of nature aforementioned as common understanding among the native population.

Chamico is Datura. From the dark side (witchcraft) twelve flowers collected at midnight, boiled and the tea consumed is used for visions. The seeds are smoked as treatment for asthma and the cooked leaves are applied as poultices for burns.

San Pedro is a cure for witchcraft, a beneficent hallucinogenic. The female cactus is boiled for six hours and the fluid inhaled and drunk. The male

(spined) is used for dark purposes. The sap is rubbed on for skin disorders.

Coca leaves are used for rheumatism in a steaming suana. They are also combined with other herbs for treatment of a sore throat and fatigue or sorroche. Using coca other than as a treatment is looked upon as being wasteful.

Other plants such as ferns, Dieffenbachia, poinsettias, caladiums, crotons and philodendrons, all common house plants in the United States, are thought to possess mystic/psychic powers over the households in which they live. These powers are as real as the healing or harming powers of the actual makeup of the plants.

Culandrillo is the common Brazilian maidenhair fern. Grown by the front door or in the house, it will warn its owner of the approach of a person with ill intent by sudden wilting or browning.

Dieffenbachia is collected in the tropical forests and carried to homes in the mountains as protection for the owners. The plain green leafed form is the best.

All Euphorbias are considered evil. This includes poinsettia and even though the plant is lovely to look upon, it should never be taken into the house or planted around one's residence. All of the milky juices are considered dangerous if they dry on the skin. The croton is a closely related jungle shrub and is treated similarly.

Anthuria, Caladium, is considered maleficent. Not only is the plant poisonous, but it releases harmful gases into the air at night in the house. Never allow a caladium indoors.

The balancing of the two sides of nature can be seen once again in the boas, the philodendrons. There is a male boa, Philodendron domesticum, and a female boa, Scindapsus aureus. These are good plants to have in a home as long as you have both. If only a male is in a home the daughters will never marry--there is a male for them in the house. If there is only a female boa in the house,

there is likely to be a divorce--too many women in a house. The only way to remove the spell from the house is to throw the offending plant into the ocean. Plants must be moved-in in pairs.

(Donde Hay No Doctor insert)

UNIT V: Ancient Traditions in Modern Life

Materials -

References - The 'Young Towns" of Lima, Lloyd
A House of My Own, Lobo
"El Agro O la Respuesta Justa," Espacia, No. 15.

As many other preconquest traditions, the allyas, or more correctly the mitm'q, still function as a primary social unit in rural society. Plowing, planting, harvesting and building are carried on not as individual projects as they are throughout most of the western world, but as community/expanded family projects. Groups of farmers in the highlands will work together in a field moving from field to field rather than working their own plots privately. Construction of homes and herding of animals also are treated in a communal manner. Extended families may include more than blood relatives. There are very few children available for adoption, or more importantly, homeless because they quickly find a place with relatives or neighbors even in areas where starvation is common. Similarly, the elderly are integrated into families functioning as contributing members in the communal living arrangements.

Mountain people moving into urban settings have transported these social concepts with them. It is quite likely that these approaches to city life are very similar to preconquest days as with commercial centers like those mentioned in "The Incas." It would also appear to be the same functional structure in the "young cities," Pueblos Jovanes, springing up overnight on public lands around Lima, Ica, Cusco, Arequipa and other large cities in the country. Surface evidence would suggest that the drought and famine in the montane areas was causing the migrations. More study, including interviews with the migrants, reveals that it is the wish for education that is a prime factor behind the move. There is frequently no more income and less food in the urban setting, but there is the possibility of education for some of the children. Education receives a respect within Peruvian society that it has lost in most better developed societies.

Pueblos Jovanes were originally viewed as chaotic slums. These "young cities" often literally spring up overnight on government land with as many as fifty mat walled shanties. Their inhabitants are poor mountain people moving to the cities--away from rural life where ancient systems of agriculture and craftsmanship are no longer overseen by a functional government maintenance system. Frequently there is little or no money available for livelihood. There is no possible method of survival apparent. In Lima these settlements form the "belt of misery" around the main city--similar settlements are obvious in Cusco and Arequipa. Administrative agencies view the settlements as hopeless but impossible to control, however closer observation reveals that the settlements are actually efficiently organized along traditional pre-conquest patterns.

Overnight a group of people move in and mark off the site. Frequently these may be individuals from different original localities. The home sites are outlined with stones and mat or cardboard walls are erected. (This is not a particular hardship for exposure to the elements since the temperature in Lima is roughly 60-80° F year round and there is measurable rainfall only about once every 25 years.) Planning goes beyond homes, however, land is set aside for a church and a school. The developing community may incorporate new individuals but the public sites are preserved. In cases where individuals have moved into these public areas unknowingly, they have been confronted by the community and move on without incident. There is a very low incidence of physical conflict in these levels of Peruvian society.

Large, extended families are housed within a small area. All individuals are expected to work for group support. Children as young as 3-5 will accompany elders to market or tourist areas within the city to sell various items ranging from hard candies and homemade pastry to used comic books and pictures or individual cigarettes or single pieces of produce. Food is grown or obtained by barter. Beans, corn and potatoes are typical fare and are often cultivated around the new house site, even inside unroofed rooms or on rare occasions in boxes on the second or third story as the house progresses. Elders and young children remaining at home cultivate the crops and do housework. Money is invested mainly in (a) materials for the education of a child (though public education is free and compulsory, a uniform must be worn), (b) bricks for construc-

tion of the house or (c) for job related equipment (automobiles for taxis, tools for gardening or repair or carpentry or electrical tools). Bricks are purchased one to a few at a time until there is enough material for a room. Rooms and then floors are built one at a time until the house is completed.

Before building begins it is not unusual for trees--commonly coconut or date, plata, mulli or eucalyptus to be planted. It is also common to see nasturtiums, pelargoniums, and poppies. Potted plants in empty tin cans are very common, often filling odd corners on balconies or roofs. This is particularly significant because these areas rarely have water. It usually must be purchased or carried long distances. The planting of long term plants and ornamental plants which furnish no food value is not consistent with the concept of short-term occupation or itinerant slums.

It has been shown in Lima, that areas beginning as Pueblos Jovenes eventually evolve into middle class neighborhoods. Government workers and professionals frequently come from the second generation in these settlements. First generation jobs progress from street salesmen to gardeners, taxi drivers, street cleaners and salesmen. Young women can find work as housecleaners, nannies and cooks. Those with some education may become aids in the schools which are frequently staffed in these areas with church workers. Work projects within the community are carried on in a manner similar to the mitm'q. Groups of men will meet on their day off and join with men from other areas to work on a building project (schools, electricity, water or sewage). The groups will meet and work in another area the following week. The communities establish their own governing councils and perform the allotted work without the established threat of reprisal.

UNIT VI: Effect of Peru's Horticulture on the World

Materials -

References -

Peru's impact on the horticultural world is not a simple thing to summarize. It is difficult to picture the cuisine of Europe prior to the use of tomatos or the common white potatoes; corn; the bulk of cultivated beans--limas, kidney, pole and bush; squash--summer, crookneck, hubbard, and forms of turban; common peanuts; and hot and sweet peppers. Other notable contributions to the diet of the temperate world include pineapples, plantains and bananas, avocados, black peppers, vanilla, cocoa, and the recently popularized jicama. Among the category of exotic foods occasionally seen are ground-cherries and husk-tomatos, cherimoya, and guavas. For tropical countries the list is far longer. (See table.)

One Peruvian pointed out that Peru was primarily responsible for the settling of the United States. Gold taken by the Spanish financed the Industrial Revolution in Britain and France through the extravagant spending of Spain. (It is estimated that as much as 1/7 of the world's gold today came from this source.) Foodstuffs collected in early conquest--beans, peppers, fruits and, to a lesser extent, potatoes and tomatos--served as incentives to other countries to attempt to clain some of the wealth of the New World. The potato taken back to England as fodder for horses eventually made its way to Ireland where the population doubled in less than twenty years with the sudden availability of food. The potato blight depleted the food in the country so drastically, it is estimated that 2/3 of the people starved or were forced to migrate to the New World.

The use of tomato paste and sauce in Mediterranean countries is directly due to the concept that the tomato, like many of its relatives, was poisonous until cooked or dried. In England, it was still rare to see tomatos as fresh vegetables on the market before the second World War. To the worry of poisoning was added the concern of the aphrodisiac qualities of the plant and its relative the hot pepper. These food sources so increased the available food

in the western world that more individuals were available for exploration and settlement.

One of the shadier acquisitions from Peru is supposedly Coca-Cola made primarily from products native to that country. Its sudden rise to popularity in the United States and the subsequent discovery of its addictive qualities led to one of the early scandals of this century and was a prime factor in the establishment of the Food and Drug Administration.

Among today's common garden flowers are cosmos, nasturtiums, cannas, caladiums, butterfly-bushes, pepper trees, ornamental peppers, coreopsis, dahlias, and calceolarias from Peru. Many of these were in ancient times the property of nobility, worn as ornaments on special occasions. It is probable that they were cultivated in areas of residence.

Peru has also been a major source of house plants and medicines as mentioned earlier. The pre-Columbian cultures are sources of information on processes as well as products. Freeze-drying, which the modern world has adapted in the last twenty years, has been common in Peruvian mountain regions for centuries. Rotation of crops for pest management was practiced before the coming of the Spanish and the "modernization of practices" in potato farming has nearly wiped out production in some areas due to the life cycle of the native potato wireworm. Irrigation systems, roads and bridges, and andenes have been studied for the last two centuries for their superior construction. Many of the vegetable storage practices used today are based on programs used by the Quechuas.

Bibliography

Alba, Victor. Peru. Boulder, Co.: Westview Press, 1977.

Acosta, S.J., Joseph de. Historia Natural y Moral de las Indias. Segunda Edicion. Mexico: Fondo de Cultura Económica, 1962.

Bankes, George. Peru Before Pizzaro. Oxford: Phaidon Press, 1978.

Baudin, Louis. Daily Life in Peru Under the Incas. New York: Macmillan, 1962.

Bennett, Wendell C. and Junius B. Bird. Andean Culture History. New York: American Museum of Natural History Handbook Series No. 15, 1949.

Bird, Junius B. "America's Oldest Farmers," Natural History, 57: New York, 1948.

Bingham, Hiram. Lost City of the Incas. Lima, Peru: Liberios A.B.C., S.A. Lima, 1975.

Brewer, Henry. A Voyage to the Kingdom of Chili in America, Performed by Mr. Henry Brewer and Mr. Elias Herckeman, in the Years of 1642 and 1643 with a Description of the Isle of Formosa and Japan. Translated from the High Dutch Original, printed at Frankford upon the Maine, 1649.

Brundage, Curr Cartwright. Lords of Cusco. Norman, Oklahoma: Oklahoma Press, 1967.

Calderon, Eduardo; Cowan, Richard; Sharon, Douglas; Sharon, F. Kaye. Eduardo el Curandero: The Words of a Peruvian Healer. Richmond, California: North Atlantic Books, 1982.

Calvo, Santiago Agurto. Cusco: la traza urbana de la ciudad inca. Cusco-Puno: UNESCO, 1980.

Castellano, Rita. "Health and Religious Curing," Project Peru (Fullbright-Hays Training Grant). Los Angeles Pierce College, Ca., 1982.

Cieza de León, Pedro de. The Incas of Pedro de Cieza de León. Translated by Harriet de Onis. Norman: University of Oklahoma Press, 1959.

Cobo, Fr. Bernabe. History of the Inca Empire. Translated and edited by Roland Hamilton. Austin: University of Texas Press, 1979.

Cutler, Hugh C. "Races of Maize in South America," Botanical Museum Leaflets 12, 1946.

Deere, Carmen Diana, and Magdalena Leon de Leal. Women in Andean Agriculture. Women Work and Development: 4. Geneva: International Labor Office, 1983.

------ "El Agro o la respuesta justa," Espacio No. 15. Lima, 1982.

Goodspeed, T. Harper. Plant Hunters in the Andes. New York: Farrar and Rinehart, Inc., 1941

Harshberger, J. W. "Uses of Plants Among the Ancient Peruvians," Bulletin of the Museum of Science and Art, no. 1. University of Pennsylvania, 1898.

Hawkes, J. G. "On the Origin and Meaning of South American Potato Names," Journal of the Linnean Society of London, 53. Botany no. 350. London, 1947.

Heiser, Charles B. and Paul G. Smith. "The Edible Arracacha," Economic Botany. 8. New York, 1954.

Isabell, Billie Jean. To Defend Ourselves: Ecology and Ritual in an Andean Village. Austin: University of Texas Press, 1978.

Lloyd, Peter. The 'Young Towns'of Lima: Aspects of Urbanization in Peru. Cambridge: Cambridge University Press, 1980.

Lobo, Susan. A House of My Own: Social Organization in the Squatter Settlements of Lima, Peru. Tucson: University of Arizona Press, 1982

Lumbreras, Luis G. The Peoples and Cultures of Ancient Peru. Translated by Betty J. Meggers. Washington, D.C.: The Smithsonian Institution Press, 1974.

MacBride, J. Francis. Flora of Peru. Field Museum of Natural History, Botanical Series 13. Chicago, 1936-56.

Metraux, Alfred. The History of the Incas. Translated from the French by George Ordish. New York: Random House, 1969.

Moseley, Michael E., and Kent C. Day. Chan Chan: Andean Desert City. Albuquerque: University of New Mexico Press, 1982.

Patterson, Thomas C. "The Emergence of Food Production in Central Peru," Nawpa Pacha, 6. Lima, 1971.

Poma, Humán (Don Felipe Humán Poma de Ayala). Letter to a King: A Peruvian Chief's Account of Life Under the Incas and Under Spanish Rule. Translated by Christopher Dilke. New York: E.P. Dutton, 1978.

Prescott, William H. History of the Conquest of Mexico and History of the Conquest of Peru. New York: The Modern Library, n. d.

Ravines, Rogger. Chanchan. Lima: Instituto de Estudios Peruanos, 1980.

Sharon, Douglas. Wizard of the Four Winds: A Shaman's Story. New York: The Free Press, 1978.

Salaman, Redcliffe N. The History and Social Influence of the Potato. Cambridge, 1949.

Sauer, Carl O. "Cultivated Plants of South and Central America," Handbook of South American Indians, Bulletin 143. Washington: Bureau of American Ethnology, 1950.

Sturtevant, E.L. Edible Plants of the World. Edited by U.P. Hedrick, New York: Dover Publications, 1969.

Towle, Margaret A. The Ethnobotany of Pre-Columbian Peru. Chicago: Viking Fund Publications in Anthropology: 10, 1978.

Troll, Carl. "Las culturas superiores andinas y el medio geographico," Allpanchis 15; La Agricultura Andina II, 1980.

Werner, David. Donde Hay No Doctor, Cusco: Centro de Estudios Rurales Andinos, n. d.

Wittmack, L. "Plants and Fruits," Necropolis of Ancon in Peru, vol. 3. New York, 1880-87.

ERIC Clearinghouse for Junior Colleges
8118 Math-Sciences Building
University of California
Los Angeles, California 90024

MAR 15 1985